PRE-CALCULUS: by Finney, Demana, Watts and Kennedy

Chapter 2: Polynomial, Power, and Rational Functions

2.1: Linear and Quadratic Modeling

What you'll Learn About

Degree: Highest Exp

Leading Coefficient
- Constant in front of the term with the highest exp.

Polynomials
- No roots
- No Neg Exp on Top
- $x^0, x^1, x^2, x^3, x^4, \ldots$

Determine which are Polynomial Functions. For those that are, state the degree and leading coefficient.

a) $f(x) = 4x^3 - 5x - .5$

yes
degree = 3
LC = 4

b) $g(x) = 6x^{-4} + 7$

No, because of $x^{-4}$

c) $h(x) = \sqrt{9x^4 + 16x^2} = (9x^4 + 16x^2)^{1/2}$

NO, because of the root

d) $k(x) = 15 - 2x^4$

yes
degree = 4
LC = -2

Write an equation for the linear function f satisfying the given conditions then graph the function.

$f(-1) = 2 \quad f(5) = 12$

Write an equation for the linear function f satisfying the given conditions then graph the function.

$f(2) = 5 \quad f(-3) = 7$

Not a polynomial

b) $f(x) = 6x^{-4} + 7$

$= \frac{6}{x^4} + 7$

$g(x) = \frac{6}{x^{-4}} + 7$

$= 6x^4 + 7$

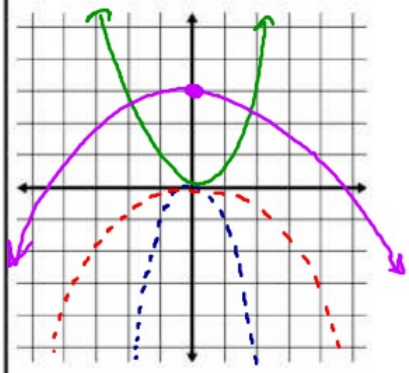
Describe how to transform the graph of $f(x) = x^2$ into the graph of the given function. Sketch each graph by hand.

a) $g(x) = -\frac{1}{2}x^2 + 3$

reflect over x

vertical compression

up 3

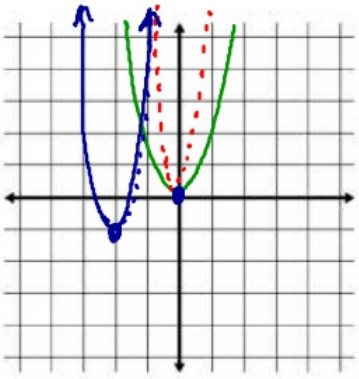


b) $h(x) = 3(x+2)^2 - 1$

vert stretch

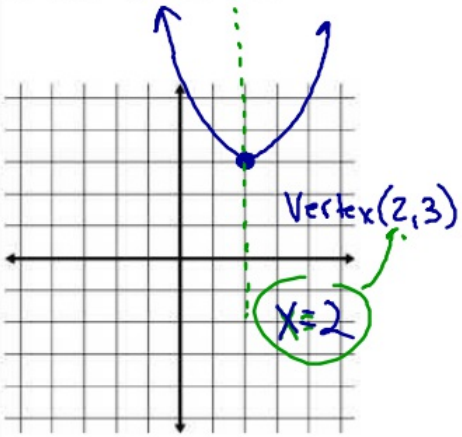
left 2

down 1



Find the vertex and axis of symmetry of the graph of the function

a) $f(x) = (x-2)^2 + 3$

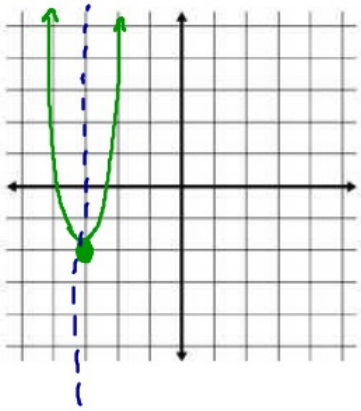



b) $f(x) = 2(x+3)^2 - 2$

A.O.S

$x = -3$

vertex (-3,-2)



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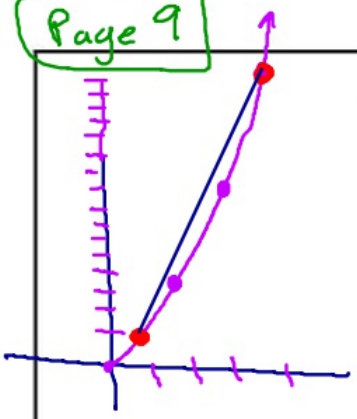

SLOPE

## Average Rate of Change

Let $f(x) = x^2$ Let $g(x) = 3x + 2$ Let $l(x) = x^3$

a) Compute the average rate of change of f(x) from x = 1 to x =4

$f(x) = x^2$

(1,1) (4,16) $AROC = \frac{16-1}{4-1} = \frac{15}{3} = 5$

b) Compute the average rate of change of g(x) from x = 1 to x =4

$g(x) = 3x+2$ $AROC = 3$

c) Compute the average rate of change of l(x) from x = 1 to x =4

$I(x) = x^3$

(1, 1) (4, 64)

$AROC = \frac{64-1}{4-1} = \frac{63}{3} = 21$